ECONOMIC COMMENTARY

Which Sector is Alberta's Largest Manufacturing Sector?

January 29, 2013

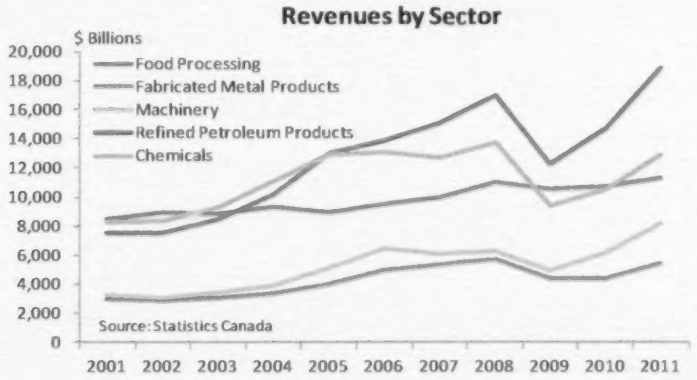
Highlights:
Using the three commonly accepted yardsticks for ranking an economy's sectors we will examine which is Alberta's largest manufacturing sector. There is no easy answer to the above question as all three yardsticks rank different sectors on top. Using revenues Alberta's refineries sector ranks well ahead of the other sectors. If the sectors are ranked using employment as the yardstick, fabricated metals ranks first. Finally, on a GDP basis machinery is the top ranked manufacturing sector in Alberta.

Alberta
Government

We are often asked which industry is the largest one in Alberta or which sector is the largest manufacturing or retail trade sector. The answer to this question is not always as straight forward as it would seem to be. Industry or sector rankings can be based on employment or revenues or Gross Domestic Product (GDP), and each of these three indicators usually provides different rankings. It is fairly easy to determine that the oil and gas industry is Alberta's leading industry as it is by far the largest one on both a revenue and GDP basis (but not on an employment basis). However, it is less clear-cut which sector is manufacturing's top sector.

In order to determine which one is Alberta's largest manufacturing sector we will look at all three indicators and at Alberta's top five manufacturing sectors: food processing; chemicals; refineries; machinery; and fabricated metals. Back in 2001 food processing was the top manufacturing sector as it ranked first for all three measures. However, since then the other four sectors have seen much higher growth than food processing. It is interesting to note that these four sectors all have strong ties to Alberta's oil and gas industry, either processing its output (refineries and chemicals) or providing its machinery and equipment (machinery and fabricated metals).

During the past 10 years, Alberta's manufacturing revenues grew by 56% to $70.9 billion in 2011. The food processing sector grew by 34% to $11.3 billion over the same time period and lost its top ranking for the revenues measure as all other major sectors had much higher growth. By 2011, the refined petroleum products sector had increased its revenues by 150% to $18.8 billion to take over the top spot. The chemicals sector, which was runner-up to food processing in 2001, also took the runner-up position in 2011 with growth of 56% to $12.8 billion. Machinery and fabricated metals also had strong growth between 2001 and 2011, expanding by 152% and 85%, respectively.



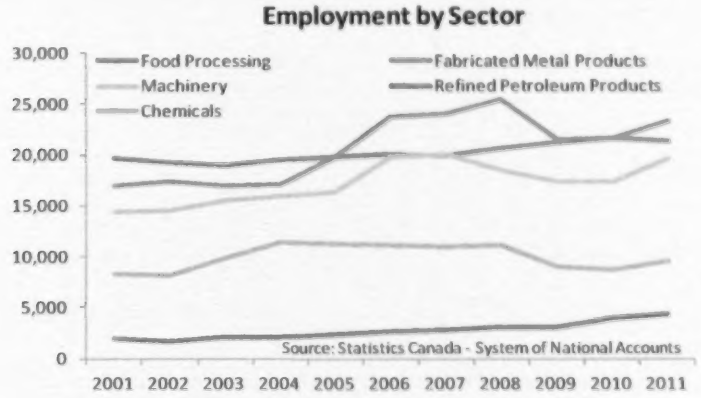
However, much of the 10-year revenue increase was the result of higher prices rather than increased output volumes. For instance, due to capacity constraints refineries had only minimal volume growth over the 10-year period, while prices of the major refinery products, such as gasoline and diesel fuel, more than doubled. Another problem with using revenues as the main yardstick is that in some industries, such as refineries, very little processing takes places and most of the value of the output can

be traced back to the value of the inputs (e.g. crude oil in the case of refineries). These industries employ relatively few workers and have a relatively low contribution to GDP.

For the employment measure there are a number of possible sources, such as Labour Force Survey (LFS), Survey of Employment, Payrolls and Hours (SEPH) and System of National Accounts (SNA). The household based LFS provides the most accurate monthly measure of employment in the province at the aggregate level, but it is not a very good source of employment by industry estimates because of its relatively small sample size and because many workers are allocated to the wrong industry when the household respondent provides information on behalf of other household members. According to the LFS the largest manufacturing sector in 2011 was food processing with 21,500 employees, followed by fabricated metals and machinery.

The monthly establishment based SEPH is a reliable source of employment by industry estimates because it is a business census of non-farm payroll employees. Since it is a company based survey it excludes self employment, but this is not a major problem for the manufacturing industry as self employment accounts for less than 3% of total employment. According to SEPH, the largest sector on an employment basis is fabricated metals with 21,547 employees in 2011, followed by machinery and food processing.

The SNA employment database combines all possible employment sources, such as the Census, LFS and SEPH, to derive employment estimates that are aligned with the GDP estimates. **Therefore, SNA could be considered as the best annual employment by industry source. SNA mirrors SEPH in that it also lists** fabricated metals as the top sector, followed by food processing and machinery. Fabricated metals' employment was 22,547 in 2011, up from 17,020 in 2001. Between 2001 and 2011, food processing employment increased by 1,700 to 21,370 jobs. The machinery sector added more than 5,000 jobs over the same period to reach 19,685 in 2011. However, the two largest industries on a revenue basis, refineries and chemicals, have far fewer employees: refineries had 4,335 workers in 2011; chemicals 9,535. Not only do fabricated metals rank first for the employment level, they also have the highest total employee compensation at an estimated $1.8 billion in 2011, followed closely by machinery.

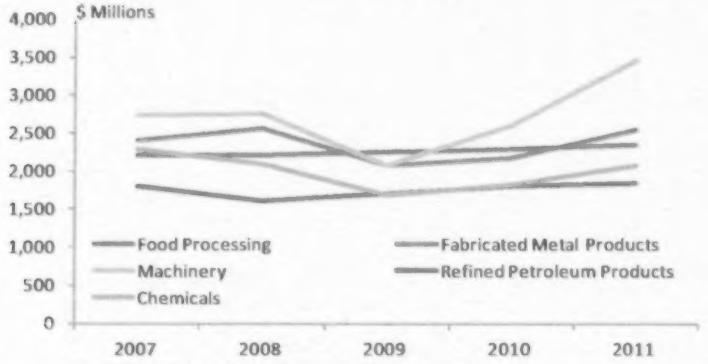


Perhaps the most commonly used indicator for ranking sectors or industries is a sector's contribution to the economy as measured by GDP. GDP is the value added by an industry or sector and can be derived by taking the difference between the value of an industry's outputs and the value of its intermediate inputs. Two of GDP's largest components are employee compensation and corporate profits.

During the 10 year period 2001 to 2011, Alberta's manufacturing GDP in constant (2007) dollars rose an estimated 23% to $18.4 billion in 2011. The food processing sector grew by 13% to $2.3 billion over the same time period and lost its top ranking for the GDP measure as three of the other major sectors had much higher growth, led by a more than doubling in output in the machinery sector.

Between 2006 and 2008, machinery was the largest manufacturing sector on a GDP basis. However, GDP in the machinery and fabricated metals sectors fell by more than 25% in 2009 because of the "great recession". During the recovery the machinery sector had exceptional GDP growth: output grew by one-quarter in 2010 and by one-third in 2011. As a result, machinery was again the largest sector in 2010 and 2011 on a GDP basis. In constant (2007) dollars, machinery was the top-ranked sector in 2011 with $3.5 billion in GDP, followed by fabricated metals at $2.5 billion and food processing at $2.3 billion.

GDP* by Sector



Source: Statistics Canada - System of National Accounts
* GDP in chained 2007 dollars

In conclusion, the three different yardsticks for determining the rankings all yield different results. On a revenue basis refineries are the clear winner, but revenues are the least preferred measure as they do not properly reflect a sector's contribution to the Alberta economy. Employment provides a better reflection of sectoral economic contribution than revenues as labour compensation is an important economic driver. The employment yardstick ranks fabricated metals first. The arguably best yardstick to use is a sector's GDP contribution, for which the machinery sector ranks first.

Revenues in $ Millions	2001	2006	2007	2008	2009	2010	2011
Food Processing	8,421	9,500	9,973	10,977	10,523	10,740	11,273
Fabricated Metal Products	2,936	4,957	5,328	5,744	4,338	4,427	5,422
Machinery	3,258	6,432	6,063	6,253	4,967	6,179	8,208
Refined Petroleum Products	7,524	13,861	15,045	16,990	12,265	14,701	18,834
Chemicals	8,243	13,056	12,719	13,739	9,419	10,504	12,837
Total Manufacturing	**45,480**	**65,091**	**65,731**	**70,146**	**53,951**	**60,074**	**70,874**

Employment (Number of Jobs - SNA basis)	2001	2006	2007	2008	2009	2010	2011
Food Processing	19,670	20,080	19,930	20,675	21,235	21,595	21,370
Fabricated Metal Products	17,020	23,750	24,025	25,460	21,485	21,590	23,345
Machinery	14,465	19,845	20,045	18,505	17,410	17,460	19,685
Refined Petroleum Products	1,895	2,630	2,795	3,100	3,090	3,975	4,335
Chemicals	8,335	11,170	11,020	11,125	9,045	8,785	9,535
Total Manufacturing	**125,710**	**140,920**	**140,855**	**139,655**	**124,105**	**125,915**	**133,835**

GDP in Millions of Constant 2007 Dollars	2001	2006	2007	2008	2009	2010	2011
Food Processing	n/a	n/a	2,204	2,219	2,252	2,282	2,346
Fabricated Metal Products	n/a	n/a	2,405	2,551	2,064	2,165	2,546
Machinery	n/a	n/a	2,737	2,760	2,078	2,598	3,451
Refined Petroleum Products	n/a	n/a	1,802	1,606	1,704	1,792	1,838
Chemicals	n/a	n/a	2,295	2,094	1,684	1,816	2,064
Total Manufacturing	**n/a**	**n/a**	**18,446**	**18,158**	**15,403**	**16,575**	**18,402**